

**61ST CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGION**

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AGENDA ITEM 3: AVIATION SAFETY

**PROPOSAL FOR THE INTEGRATION OF CREW RESOURCE
MANAGEMENT (CRM) INTO FLIGHT OPERATIONS**

(Presented by the People's Republic of China)

SUMMARY

While Contracting States worldwide have widely instituted CRM training as an established industry practice, ICAO Annex 6 to the Convention on International Civil Aviation – Operation of Aircraft contains no explicit provisions or requirements concerning CRM. This paper proposes to embed CRM as a core flight operations component underpinned by proactive Threat and Error Management (TEM) countermeasures. Transforming CRM from a peripheral training requirement into collaborative safety defence barriers is helpful to address the inherent limitations of static operational defence. The paper therefore requests the Conference to endorse the launch of the Annex 6 amendment process and prompt Contracting States to collaboratively develop relevant guidance material to strengthen the resilience of global flight operations.

PROPOSAL FOR THE INTEGRATION OF CREW RESOURCE MANAGEMENT (CRM) INTO FLIGHT OPERATIONS

1. INTRODUCTION

1.1 Pursuant to Annex 6, the definition of Human Performance explicitly accounts for human capabilities and limitations as well as their impact on the safety and efficiency of flight operations. In accordance with the safety management principles set out in ICAO Doc 9859, the Safety Management Manual (SMM), modern aviation systems achieve a high level of technical reliability. Nevertheless, human factors constitute the most volatile variable affecting operational safety and efficiency, as human performance directly governs an operator's overall safety management performance.

1.2 Statistical analysis of 514 global safety occurrences recorded from 2016 to 2025 identifies CRM-related contributing factors across 294 events and confirms a marked correlation between aviation safety incidents and the effectiveness of CRM implementation.

1.3 Further review of the 294 CRM-relevant operational occurrences shows 76.17% stemmed from inadequate development or sustainment of shared situational awareness, and 57.42% from shortcomings in team-level decision-making. These findings demonstrate existing CRM practices fall short of effective conversion into cross-functional and cross-system collaborative defensive capabilities. Such insufficient collaborative integration at operational interfaces constitutes a substantial obstacle to safety performance improvement.

1.4 Based on the above analysis, embedding CRM into flight operations is critical to advancing overall aviation safety performance.

2. DISCUSSION

2.1 At present, Annex 6 contains no dedicated explicit provisions or requirements concerning CRM. Definitions of CRM in current ICAO documents (Doc 9683, 9868, 9995) are framed around personnel training and qualification management. This proposal recommends embedding CRM alongside TEM countermeasures. Conversion of such cognitive and crew coordination skills into resilient collaborative safety defence barriers within operational frameworks enables aircraft operators to mitigate the inherent limitations of static operational defences and lift the overall resilience of flight operations.

2.2 Existing regulatory oversight has not yet established a standardized mechanism for assessing the actual effectiveness of CRM-based collaborative safety defence barriers within complex, dynamic operating environments. Inspectors frequently encounter challenges in verifying whether these behavioral barriers achieve a true synergistic effect in mitigating threats and errors during flight operations. This misalignment fosters a discrepancy between 'satisfactory training compliance' and the actual operational performance of CRM as collaborative safety defence barriers.

2.3 Existing Annex 6 provisions for Flight Data Analysis (FDA) programmes centre largely on routine compliance. No existing regulatory provision mandates assessment of functional synergy between static operational defences and crew performance. This framework is unable to adequately reflect CRM's role as a dynamic bridge that offsets the inherent limitations of static operational defences, and restricts operators from shifting from reactive compliance management to proactive resilience building and evidence-based CRM improvement.

2.4 While Annex 6 addresses fundamental elements of CRM—such as flight crew coordination, human performance, and error management—scope remains for further advancement

regarding CRM implementation and mandatory training requirements. Furthermore, existing provisions could be enhanced to encourage integrated CRM training across functional boundaries. Adopting a cross-disciplinary approach would significantly improve collaborative effectiveness across functions and build greater systemic resilience. China has accumulated more than 30 years of experience in CRM, during which the training and oversight frameworks have been progressively enhanced and updated. China is willing to work collaboratively with Contracting States and relevant stakeholders to support related work, consolidate excellent practices and contribute to the development of practical, operationally relevant and implementable guidance material.

2.5 At present, there is a lack of guidance materials for embedding CRM into flight operations, resulting in divergence in implementation and oversight across Contracting States. To address this gap, this paper proposes the development of guidance material for CRM, aiming to deepen the integration of CRM into flight operations and translate it into actionable and assessable methods and tools. This guidance material is intended to achieve, but is not limited to, the following objectives:

Shift CRM training away from conventional classroom instruction toward a competency-based and evidence-based framework, with the ultimate goal of developing individual competency in resilience and adaptability, and team competency in effective collaboration.

Empower regulatory authorities to assess the actual performance of CRM as TEM countermeasures within the flight operational system, ensuring that operators move beyond mere compliance with prescribed CRM training requirements and actively strengthen the effectiveness of CRM as collaborative safety defence barriers.

Enable robust flight data analysis to precisely drive the continuous improvement of static operational defences and CRM training while guiding organizational management to optimize resource allocation.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) note the need of adding explicit CRM provisions to Annex 6, recognizing that robust CRM deliver tangible safety benefits to flight operations;
- b) consider amending Annex 6 to include explicit provisions on CRM and develop relevant guidance material, thereby strengthening the systemic resilience of flight operations via the embedding of CRM; and
- c) bring the content of this discussion paper to the attention of the Air Navigation Commission (ANC), and to invite the ANC to consider the development and approval of the new Job Card, with a view to initiating the necessary work for subsequent amendments to Annex 6 and the development of associated guidance material.

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